Chapter - III

PROCEDURE

In this chapter selection of subjects, selection of variables, criterion measures, procedure for analyzing the data have been described.

Selection of Subjects

2100 school going children were randomly selected from Wayanad district of Kerala. 700 subjects from each of the three tribal groups namely Paniyar, Kurichchiar and Kurumar with 70 selected from both the sexes from the age of 9 – 13 years.

The subjects were oriented properly and the investigator held a meeting with the subjects prior to the administration of test. The purpose and the significance of the study were explained to them in detail before conducting the test.

The procedure for taking measurements were also explained and demonstrated to them and the trial measurements were taken. All the subjects agreed to co-operate in the testing administration.

Selection of Variables

Keeping in mind the feasibility criteria, availability, of equipments and the purpose of the investigation the following variables were selected.

1. The AAHPERD (Baumgartner and Jackson 1982) Health related physical fitness test was selected to measure and assess the status of components of physical fitness. The components are:

a) Cardio-Respiratory Function

   (i) One mile run
b) **Body Composition**

(i) Sum of triceps and sub scapular skin folds

c) **Abdominal and low back Hamstring musculo-skeletal function**

(i) Modified timed sit-ups  
(ii) Sit and reach

**Anthropometric Variables**

The following anthropometric variables were selected to find the nutritional status of the children:

(i) Age  
(ii) Height  
(iii) Weight

**Criterion Measures**

1. Height was measured with a standard stadiometer to the nearest 1/10 of a centimeter.

2. Body weight was recorded to the fraction of 1/10 of a kilogram with a standard weighing machine.

3. Cardio respiratory function was assessed by the time taken in seconds for the one-mile run.

4. Body composition was determined by the sum of skin fold of triceps and sub scapular is and expressed in millimeters

5. Abdominal muscular strength and endurance was assessed by the number of correctly executed sit-ups performed in sixty seconds.

6. Flexibility was measured by sit and reach test and recorded in centimeters.

7. Nutritional status was determined through anthropometric measurements. Viz. age, height, weight and skin fold thickness over triceps. It was measured and recorded in centimeters, kilogram and in millimeters respectively.
Reliability of Data

The reliability of data was ensured by establishing the instrument reliability and tester competency.

Instrument Reliability

All the instruments used in the study were purchased from the reliable manufacturers. Most of them cater to the needs of research laboratories all over the World.

Therefore, the instruments were presumed to be accurate and reliable. Inspite of that the investigator tried to establish the reliability of the following instruments:

(a) Lange’s skinfold caliper was used to measure the skinfold thickness in millimeters. It was a standard equipment supplied by Austen Corporation, New York, and it was accurate enough for the purpose the study.

(b) The stop-watches used for the study were all calibrated (Recep) digital electronic watch made in India to gather accurate data.

Tester Competency

To ascertain the investigator’s competency in collecting relevant data on selected health related physical fitness variables and the anthropometric variables such as ‘height’ and ‘weight’, the research scholar had practice sessions under the guidance of Dr. (Mrs.) Indu Mazumdar, Advisor of the research scholar so as to get confidence in administering test and taking required measurements.

To establish the tester competency, 30 subjects were chosen at random and data were collected on all the items of AAHPERD health related physical fitness test and anthropometric variables by the research scholar.
The Pearson’s product moment correlation was computed for the data on all the test items administered by the research scholar and expert, the result of which are presented in Table 1.

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Co-efficient of Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>0.98</td>
</tr>
<tr>
<td>Weight</td>
<td>0.97</td>
</tr>
<tr>
<td>One Mile Run</td>
<td>0.89</td>
</tr>
<tr>
<td>Skinfold Thickness Triceps</td>
<td>0.88</td>
</tr>
<tr>
<td>Subscapular</td>
<td>0.87</td>
</tr>
<tr>
<td>Sit-ups</td>
<td>0.95</td>
</tr>
<tr>
<td>Sit and Reach</td>
<td>0.91</td>
</tr>
</tbody>
</table>

The above table shows a high correlation ranging from 0.87 to 0.98 for the test score of the different test items administered by the research scholar and the experts. Therefore, the tester competency in administering was ensured.

**Administration of Test**

**Health Related Physical Fitness Variables**

**Distance run-one mile**

**Purpose:** To measure maximal functional capacity and endurance of the cardio respiratory system.

**Equipment:** Stop watch, scorecards, and pencil.

**Procedure:** Students were instructed to run one mile in the fastest possible time. When the signal 'ready', 'start' the students begin the race and when they crossed the finish line, the elapsed time was called to their partners. Walking was allowed but was instructed to cover the distance in the shortest possible time.
Scoring: The elapsed time from start to finish was scored to the nearest seconds.

**Skin fold thickness**

Purpose: To evaluate the level of fatness.

Equipment: Skinfold Caliper

![Fig. 1]

Measurement of Skinfold Thickness - Triceps
Triceps

The triceps skin fold is measured more commonly than any other part, because it is so accessible. It is closely correlated with percentage of body fat with total body fat.

Procedure: It was measured in the midline of the posterior aspect of the right arm, over the triceps muscles, at a point midway between the lateral projection of the acromian process of the scapula and the inferior margin of the olecranon process of the ulnar. The level of the measurement is determined by measuring the distance between the lateral projection of the acromial process and the inferior border of the olecranon process of the ulna using a tape measure, with the elbow flexed at 90 degrees. The tape was placed with its zero mark on the acromian and stretched along the upper arm extending below the elbow. The mid point was marked on the lateral side of the arm. The subject was measured standing and skin fold was measured with the arm, hanging loosely and comfortably on the subject’s side. The triceps skin fold is picked up with the left thumb and index finger, approximately one centimeter proximal to the marked level, and the tips of the calipers are applied to the skin fold at the marked level.

Sub scapular

Procedure: Sub scapular skin fold thickness is a measure of subcutaneous adipose tissue and skin thickness on the posterior aspect of the torso. The sub scapular skin fold was picked up on the diagonal, inclined inferio-laterally, approximately 45 degrees to the horizontal plane in the natural cleavage line of the skin. The site was just inferior to the inferior angle of the scapula. The caliper jaws were applied one-centimeter inferio-lateral to the thumb and finger raising the fold.

Scoring: Each measurement was taken three consecutive times and the median score was recorded to the nearest 0.5 millimeters.
Fig. 2

Measurement of Skinfold Thickness Subscapular

**Modified sit-ups**

**Purpose:** To evaluate abdominal muscular strength and endurance

**Equipment:** Mats, stop watch.

**Procedure:** To assume the starting position the subjects lied on their back with knee flexed, feet on floor, with the heels between 12 to 18 inches from the buttocks. The arms were closed on the chest with the hands on the opposite shoulders. The feet were held by partners to keep them in touch with the testing surface. The students curled to the starting position by tightening abdominal muscles. The arms contact with the chest was maintained. The chin remained tucked on the chest. The sit up was completed when the elbows touched the thighs. To complete the sit up the student returned to the down position until the mid back made contact with the testing surface.
**Measurement of Abdominal Muscular Strength and Endurance – Sit-Ups**

**Scoring:**
The number of correctly executed *sit ups* performed in 60 seconds was the score.

**Sit and Reach**

**Purpose:**
To evaluate the flexibility of the low back and posterior thighs.

**Equipment:**
The test apparatus consists of specially constructed box (12 inches by 12 inches by 21 inches) with a measuring scale were 23 cm at the level of the feet.

**Procedure:**
Students with out shoes sat down at the test apparatus with their knees fully extended and the feet, shoulder-width apart. The feet was kept flat against the end board. The arms were extended forward with the hands placed on top of each other to perform the test. The student reached directly forward, palms down along the measuring scale four times and held the position of maximum reach on the fourth trial and the position was maintained for one second.
Measurement of Flexibility – Sit and Reach

Scoring: The score was the farthest point reached on the forth trial and was measured to nearest centimeter.

Anthropometric Variables

Anthropometry has been accepted as an important tool for the assessment of nutritional status. Weissell (1982) reported that anthropometric data are being used increasingly in estimating nutritional status.

Nutritional Anthropometry was adopted in the present study because the pattern of growth and physical fitness of an individual through genetically determined, are profoundly influenced by diet, as explained by Gai (1996)

To assess the nutritional status the following anthropometric measurements were selected.

(a) Age
(b) Standing height.
(c) Weight.
(a) **Age**

**Purpose:** To measure the age in completed years.

**Procedure:** The correct age of the child should be ascertained from the school record.

(b) **Standing Height**

**Purpose:** To measure the actual body height.

**Equipment:** Stadiometer.

**Procedure:** The height was measured using stadiometer. The students were made to stand on the even floor with feet together and with head, shoulder, buttocks and heels touching the wall. The head was held comfortably erect. A wooden block was used as headpiece, which was gently, lowered crushing the hair and making contact with the top of the head.

**Scoring:** The measurements were taken up to the nearest 0.1-centimeter.

(c) **Weight**

**Purpose:** To measure the body weight.

**Equipment:** Standard Weighing Machine.

**Procedure:** The weight was measured by using a standard weighing machine. Students were weighed wearing very light clothing without foot wears. Children were made to stand on the center of the weighing machine without touching anything else outside. Care was taken to use the balance on a firm mantled surface and it was checked before use.

**Scoring:** The measurement was taken to an accuracy of 0.1 kilogram.
Assessment of Nutritional Status

According to Vijayaraghavan (1987) weight-for-age, height-for-age, weight-for-length and arm circumference singly or in combination were extensively used for determining nutritional status.

Of the different measurements used in anthropometry, the following nutritional indicators were selected in this study as they are found to be most appropriate to assess the nutritional status of the children.

(a) Weight-for-age
(b) Height-for-age

(a) Weight-for-Age:

Weight is the measurement of body Vijayaraghavan (1996). Weight deficiency appears to be the best indicator of the prevalence of protein energy malnutrition among all age groups.

Jelliffe (1966) is of the opinion that comparison of weight for age values with regional standards at corresponding ages will help to determine the degree of under weight in a community. The weight of the students measured was compared with NCHS standards.

(b) Height-for-Age:

Height is a linear measurement made up of the sum of four components, leg pelvis, spine and skull. The extend of height deficit in relation to age as compared to regional standards is regarded as a measure of the duration of malnutritions as suggested by Gopaldas and Seshadri (1987). A deficit of height may represent a short period of growth failure at an early age or a short period of growth failure at a later stage. Hence the height of all subjects were measured with NCHS standards.
Grading of Nutritional Status

(a) **Weight-for-Age:**

Various methods have been suggested to classify children in to various nutritional grades using body weights. The most widely used classification is the Gomez's classifications. In which the children are classified as having first, second or third degree malnutrition if their weight-for-age is in the range of 75 to 90 percent, 60 to 75 percent or less than 60 percent respectively of the reference median. All children whose weight is 90 percent and above are categorized as normal (Bamji, 1996).

The above mentioned method was used to assess the nutritional status of the subjects, which was found adequate for the study.

**Statistical Procedure**

The raw data collected from the AAHPERD physical fitness test was converted to the percentile scores using the AAHPERD physical fitness test manual.

The percentile rank represents the percentage of students who scored at or below the provided test scores. The larger percentile represents higher levels of physical fitness.

The mean values of height and weight of the children were compared with NCHS standards.

Two way analysis of variance was performed to find out if any difference existed between the tribal groups, age group and sex of the subjects selected.

Scheffe's post hoc (Clark, 1972) test was performed to determine the significance between the paired mean where f-ratio was found to be significant.

Descriptive statistics was also performed to get the exact picture about the population sample. Level of significance was fixed at .05 level.